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ARMY ENGINEER DISTRICT NORFOLK VA
NATIONAL DAM SAFETY PROGRAM, LAUREL CREEK DAM (INVENTORY NUMBER--ETC(U))
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NEW RIVER BASIN
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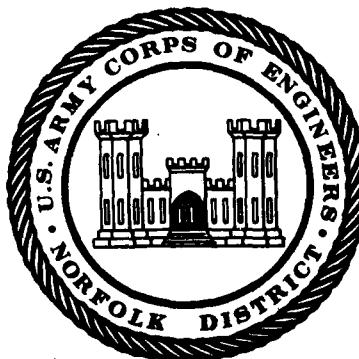
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Name Of Dam: LAUREL CREEK
Location: GRAYSON COUNTY
Inventory Number: VA 07704

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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PREPARED BY
NORFOLK DISTRICT CORPS OF ENGINEERS
803 FRONT STREET
NORFOLK, VIRGINIA 23510

APRIL 1981

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER VA 07704	2. GOVT ACCESSION NO. AD-A103717	3. RECIPIENT'S CATALOG NUMBER (9)	
4. TITLE (and Subtitle) Phase I Inspection Report National Dam Safety Program. Laurel Creek Inventory Number VA 07704 Grayson County, VA New River Basin.		5. TYPE OF REPORT & PERIOD COVERED Final report	
6. AUTHOR(s) Grayson County, Virginia Norfolk District, Boris O. Taran phase I Inspector		7. PERFORMING ORG. REPORT NUMBER Norfolk District	
8. CONTRACT OR GRANT NUMBER(s)		9. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
10. PERFORMING ORGANIZATION NAME AND ADDRESS U. S. Army Engineer District, Norfolk 803 Front Street Norfolk, Virginia 23510		11. REPORT DATE Apr 1981	
12. CONTROLLING OFFICE NAME AND ADDRESS Boris O. Taran		13. NUMBER OF PAGES 1	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified	
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited		17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)	
18. SUPPLEMENTARY NOTES Copies are obtainable from National Technical Information Service, Springfield, Virginia 22151			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dams - VA National Dam Safety Program Phase I Dam Safety Dam Inspection			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) (See reverse side)			

20. Abstract

Pursuant to Public Law 92-367, Phase I Inspection Reports are prepared under guidance contained in the recommended guidelines for safety inspection of dams, published by the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I Inspection is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general conditions of the dam is based upon available data and visual inspection. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

Based upon the field conditions at the time of the field inspection and all available engineering data, the Phase I report addresses the hydraulic, hydrologic, geologic, geotechnic, and structural aspects of the dam. The engineering techniques employed give a reasonably accurate assessment of the conditions of the dam. It should be realized that certain engineering aspects cannot be fully analyzed during a Phase I inspection. Assessment and remedial measures in the report include the requirements of additional indepth study when necessary.

Phase I reports include project information of the dam appurtenances, all existing engineering data, operational procedures, hydraulic/hydrologic data of the watershed, dam stability, visual inspection report and an assessment including required remedial measures.

NEW RIVER BASIN

NAME OF DAM: LAUREL CREEK DAM
LOCATION: GRAYSON COUNTY, VIRGINIA
INVENTORY NUMBER: VA 07704

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of the Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the design flood should not be interpreted as necessarily posing a highly inadequate condition. The design flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

BRIEF ASSESSMENT OF DAM

Name of Dam: Laurel Creek Dam
State: Virginia
Location: Grayson County
USGS Quad Sheet: Middle Fox Creek, Virginia
Stream: Laurel Creek
Date of Inspection: 22 April 1981

Laurel Creek Dam is an earthen structure about 250 feet long and 17.5 feet high. The dam is owned and maintained by Mr. A. C. Richardson of Independence, Virginia. The dam is classified as a small dam with a significant hazard classification. The principal spillway is a 30-inch corrugated metal pipe (CMP) drop-inlet with a 36-inch CMP control at normal pool. The emergency spillway is an open channel cut in the left abutment. The reservoir is used for recreation.

Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) is the 100 Year Flood. The spillway will pass 9 percent of the PMF or 19 percent of the SDF without overtopping the crest of the dam. The SDF will overtop the dam by about 1 foot, flow over the dam about 4 hours and reach a maximum velocity of 4.6 feet per second. Overtopping velocities are not considered detrimental to the dam. The spillway is adjudged as inadequate but not seriously inadequate.

The visual inspection revealed no apparent problems and there are no immediate needs for remedial measures. Maintenance is performed by the owner. However, there is no regular maintenance operations program or warning system. It is recommended that a regular maintenance and operations program be instituted with provisions for accurate records of all maintenance performed. It is also recommended that a warning system be established and that the maintenance items listed in Section 7.2 be accomplished as part of the regular maintenance program within the next 12 months.

Submitted By:

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Colonel Corps of Engineers
Commander and District Engineer

Date: JUL 6 1981



DAM



RESERVOIR

OVERALL VIEWS- LAUREL CREEK DAM

22 APRIL 1981

SECTION 1
PROJECT INFORMATION

1.1 GENERAL:

1.1.1 Authority: Public Law 92-367, 8 August 1972, authorized the Secretary of the Army, through the Corps of Engineers to initiate a National Program of Safety Inspections of Dams throughout the United States. The Norfolk District has been assigned the responsibility of supervising the inspection of dams in the Commonwealth of Virginia.

1.1.2 Purpose of Inspection: The purpose is to conduct a Phase I inspection according to the Recommended Guidelines for Safety Inspection of Dams (Reference 1, Appendix IV). The main responsibility is to expeditiously identify those dams which may be a potential hazard to human life or property.

1.2 Project Description:

1.2.1 Dam and Appurtenances: Laurel Creek Dam is an earthfill structure about 250 feet long and 17.5 feet high. The crest of the dam is 11 feet wide at elevation 3567.5. A private gravel drive way to the owners home traverses the crest of the dam. The upstream slope is 4 horizontal to 1 vertical (4H:1V) and the downstream slope is (3H:1V). There is no slope protection on the embankment.

According to the owner and a local resident who observed the actual construction, the dam is keyed into the foundation by a core trench. It is unknown if there are any foundation drains. There are no foundation drain outlets.

The principal spillway is a 30-inch CMP drop inlet with a 36-inch CMP trash control at normal pool (elevation 3565.0).

The emergency spillway is an open channel cut into the left abutment with an effective width of 3 feet. A wooded bridge deck passes over the control section with riprap protection on the left side of the channel.

There is a cable attached to the drop inlet that can operate a drawdown gate at the bottom of the reservoir.

1.2.2 Location: Laurel Creek Dam is located on Laurel Creek about 4 miles southeast of Sugar Grove, Virginia in the Jefferson National Forest.

1.2.3 Size Classification: The dam classified as small as defined in Reference 1 of Appendix IV.

1.2.4 Hazard Classification: The dam is located upstream of two cabins, which are inhabited only part of the time. Should the dam fail property damage will occur and possibly endanger lives; therefore, a significant hazard classification is given according to guidelines contained in Section 2.1.2 of Reference 1, Appendix IV. The hazard classification used to categorize a dam is a function of location only and has nothing to do with its stability or probability of failure.

1.2.5 Ownership: Mr. A. C. Richardson of Independence, Virginia.

1.2.6 Purpose: Recreation.

1.2.7 Design and Construction History: The dam was constructed in 1974. The designer and contractor are unknown.

1.2.8 Normal Operational Procedures: Water flows automatically through the principal spillway as the pool rises above elevation 3565.0. Flows will automatically pass through the emergency spillway when the reservoir rises above elevation 3565.5.

1.3 Pertinent Data:

1.3.1 Drainage Area: The dam controls a drainage area of 0.87 square miles.

1.3.2 Discharge at Dam Site: The maximum flood at the dam site occurred in the fall of 1977 when about one foot depth of water passed over the center portion of the dam. The discharge was approximately 800 cubic feet per second (cfs).

Pool level at crest of dam.

1.3.3 Dam and Reservoir Data: Pertinent data on the dam and reservoir are shown in the following table:

TABLE 1.1 DAM AND RESERVOIR DATA

Item	Elevation feet msl	Area Acres	Reservoir Capacity		Length, feet
			Acre feet	Watershed, Inches	
Crest of Dam	3567.5	12	60	1.3	2400
Emergency Spillway	3565.5	9.6	53	1.1	2100
Principal Spillway	3565.0	9.2	51	1.1	2000
Streambed at Down- stream toe of dam	3550.0+	-	-	-	-

SECTION 2
ENGINEERING DATA

2.1 Design: There is no known design information.

2.2 Construction: There are no known construction records other than the fact that the dam was completed in 1974. However, Mr. Richardson, the owner, states that some SCS personnel did hand augers in the location of the dam, that the material for the embankment was taken from the upstream right abutment, and that the dam was keyed into weathered rock down to "good rock".

2.3 Evaluation: There is insufficient information to evaluate foundation and embankment stability.

SECTION 3
VISUAL INSPECTION

3.1 Findings:

3.1.1 General: The results of the 22 April 1981 inspection are recorded in Appendix III. At the time of the inspection, the weather was clear and warm. The temperature was 60° - 70° F and the ground conditions were moist. The pool elevation was 3565.6 feet msl, or about 0.1 feet above normal pool elevation. The tailwater was at 3551.4 feet msl. There are no known prior inspection reports.

3.1.2 Embankment: The embankment is in good condition. Sketches showing a plan view, a cross section, and a profile of the crest are provided on Plates II and III, Appendix I. An overall view of dam is provided at the beginning of the report.

There are no signs of surface cracks, unusual movement, sloughing, misalignment, or riprap failure. However, the dam has previously experienced overtopping and the lower third of the downstream face has scattered small eroded gullies. Near the right abutment these gullies extend approximately two thirds of the way up the downstream face. There is also an eroded ditch running down the downstream right abutment. (See Plate II, Appendix I, Photos No. 3 and 4, Appendix II, and overall view of the dam at the beginning of the report).

The crest serves as a gravel roadway. It was recently graded and the excess graded material laid on the upper portion of the upstream face.

A seep is located on the downstream toe approximately 30 feet left of the principal spillway outlet pipe. The flow is barely noticeable and is discolored (rust colored) with iron bacteria. A wet area extends along the toe from the seep to the outlet pipe. (See Plate II, Appendix I and Photo No. 9, Appendix II).

Flow is passing through both the principal and the emergency spillway (See Photos No. 3, 6, 7, 8, & 9, Appendix II).

The embankment is well vegetated with grass with the exception of the crest, which is gravel, and the eroded areas on the downstream face. There are also several scattered small shrubs and saplings on the downstream face. (See Photos No. 1, 2, 3, & 4, Appendix II and the overall view of the dam at the beginning of the report).

Materials for the embankment were taken from the upstream right abutment hillside. This material is a fine to medium sand with some (20% - 30%) silt.

3.1.3 Outlet Works: A vertical 30-inch CMP acting as a drop inlet serves as the intake. The intake is surrounded by a 36-inch CMP which extends above normal pool to prevent trash from washing into the principal spillway. The 30-inch CMP passes, under the dam and discharges into a rock lined stilling basin at the toe. A wire cable attached to a drawdown gate at the bottom of the reservoir acts as an emergency gate. Lifting the cable activates the gate (See Photos No. 3, 5, & 6, Appendix II)

3.1.4 Emergency Spillway: The emergency spillway is a V-shaped channel cut through natural ground in the left abutment. The approach channel is well vegetated with grass. The discharge channel is a slightly eroded channel that directs flows into the stilling basin. The control section is where a bridge passes over the channel at the crest elevation (See Plate II, Appendix I, and Photos No. 1, 7, 8 & 9, Appendix II).

3.1.5 Instrumentation: There is no instrumentation on the dam.

3.1.6 Reservoir Area: The reservoir slopes are gently to moderately steep throughout the watershed. Much of the area is pasture land while the outer perimeter is heavily wooded. There are no signs of reservoir slope failure. There is some minor shoreline erosion on the reservoir (See overall view of the reservoir at the beginning of the report).

3.1.7 Downstream Channel: The downstream slopes are moderately steep to steep with many trees. A cabin is located immediately below the outlet adjacent to the downstream channel. Rocks and trees line the channel as it passes by another cabin about 1000 feet downstream. The cabins are inhabited only part of the time by hunters (See Photo No. 10, Appendix II and the overall view of the dam at the beginning of the report).

3.2 Evaluation: Overall the dam appeared to be in good condition. The inspection revealed certain preventative maintenance items which should be scheduled as part of an annual maintenance program. These are:

- a. The eroded gullies on the downstream face should be filled with compacted material, graded to conform with the existing slope, and reseeded.
- b. The seep and the wet area should be monitored for any increase in flow or turbidity during periodic inspections. If any increase in flow or turbidity is noted without an explanation the services of a geotechnical engineer should be obtained to investigate the causes of the increases.
- c. The shrubs and saplings on the downstream face should be cut off at the ground surface.
- d. A wire screen trash rack should be added to the intake structure to prevent debris from washing into the principal spillway.
- e. A staffgage should be installed in the reservoir to extend above the crest of the dam.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures: The normal storage pool elevation is 3565.0, which is the crest of the 36-inch CMP control connected to the 30 inch CMP principal spillway. Water passes automatically through the principal spillway as the reservoir rises above elevation 3665.0. Water will pass through the emergency spillway automatically as the pool rises above elevation 3565.5. A cable connected to the drop inlet can operate a drawdown gate (assumed 30-inch) at the bottom of the reservoir.

4.2 Maintenance: There is no formal maintenance program for Laurel Creek Dam; although, some maintenance is performed on an as needed basis.

4.3 Warning System: At present time, there is no warning system or evacuation plan for Laurel Creek Dam.

4.4 Evaluation: The dam does not require an elaborate operation and maintenance program. However, the program should be expanded to help detect and correct problems as they occur. An emergency operation and warning plan should be developed. It is recommended that formal emergency procedures be prepared and furnished to all persons responsible of maintaining the dam and facilities. This should include:

- a. How to operate the dam during an emergency.
- b. Who to notify, in case evacuation from the downstream area is necessary.

SECTION 5

HYDRAULIC/HYDROLOGIC DATA

5.1 Design: None were available.

5.2 Hydrologic Information: None were available.

5.3 Flood Experience: During the Fall of 1977 the crest of the dam was overtopped by about approximately one foot near the center of the dam.

5.4 Flood Potential: The 100-year flood, 1/2 PMF and PMF were developed and routed through the reservoir by use of the HEC-1DB computer program (Reference 2, Appendix IV) and appropriate unit hydrograph, precipitation and storage-outflow data. Clark's Tc and R coefficient for the local drainage area were estimated from basin characteristics. The rainfall applied to the developed unit hydrographs was obtained from the U. S. Weather Bureau Publications (Reference 3 and 4 of Appendix IV).

5.5 Reservoir Regulation: Pertinent dam and reservoir data are shown in Table 1.1.

Water passes automatically through the principal and emergency spillways as the reservoir rises above elevations 3565.0 and 3565.5, respectively.

The storage curve was developed based on areas obtained from a U. S. Geological Survey Quadrangle Map. Survey data taken during the inspection was correlated to the Middle Fox Creek, Virginia Quadrangle Map to help develop area-storage data. Rating curves for the spillways and non overflow sections drawdown gate were developed. In routing hydrographs through the reservoir, it was assumed that the initial pool level was at the principal spillway crest (elevation 3565.0).

5.6 Overtopping Potential: The probable rise in the reservoir and other pertinent information on reservoir performance is shown in the following table:

Table 5.1 RESERVOIR PERFORMANCE

Item	Normal Flow	100 1/ Year	1/2 PMF	PMF 2/
Peak flow c.f.s.				
Inflow	1	957	2819	5637
Outflow	1	829	2748	5555
Maximum elevation ft. msl	3565.0	3568.49	3569.79	3571.22
Non-overflow section (elevation 3567.5)				
Depth of flow, ft.	-	.99	1.29	3.72
Duration, hrs.	-	4	14	18
Velocity, fps 3/	-	4.6	7.0	8.9
Tailwater elevation ft. msl	-	-	-	-
	3551.4+			

1/ The 100-Year Flood has one chance in 100 of occurring in any given year.

2/ The PMF is an estimate of flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.

3/ Critical Velocity

5.7 Reservoir Emptying Potential: A 30-inch gate at an approximate invert elevation 3552.0 is available to dewater the reservoir. The low level outlet will permit a withdrawal of about 82 cfs with the reservoir at the crest of principal spillway (elevation 3565.0) and essentially dewater the reservoir in less than one day. This is equivalent to an approximate drawdown rate of 18 feet per day based on the hydraulic height measured from normal pool divided by the time to dewater the reservoir.

5.8 Evaluation: Based on the size (small) and hazard classification (significant) the recommended Spillway Design Flood is the 100 Year Flood to the 1/2 PMF. Because of the risk involved, the 100 Year Flood has been selected as the SDF. The spillway will pass 9 percent of the PMF or 19 percent of the SDF without overtopping the crest of the dam. The SDF will overtop the dam by about 1 foot, flow over the dam about 4 hours, and reach an average critical velocity of 4.6 fps.

Conclusions pertain to present day conditions. The effect of future development on the hydrology has not been considered.

SECTION 6

DAM STABILITY

6.1 Foundation and Abutments: There is no detailed information available on the local geology or foundation conditions. The dam is located within the Blue Ridge physiographic Province of Virginia and is underlain by rocks belonging to the Chilhowee group of Precambrian age. No outcrops were found during the inspection but a boulder on the right abutment consisted of a fine grained arkosic sandstone. A boulder found on the left abutment was composed of a trachyte porphyry. These samples indicate that the local rocks may belong to the Unicoi Formation (of the Chilhowee group). Locally the Unicoi is made up of conglomerates, shales arkosic sandstones and volcanics.

As noted in the visual inspection there is a seep and a wet area on the downstream toe. According to the owner and a local resident who observed the construction the dam is keyed into the foundation with a core trench. It is unknown if there are any foundation drains. There are no foundation drain outlets. The predominate overburden materials are relatively pervious, stable, silty sands.

6.2 Embankment:

6.2.1 Materials: The embankment materials were taken from the upstream right abutment hillside. These materials are fine to medium sand with some silt.

6.2.2 Stability: There are no available stability calculations. The dam is 17.5 feet high and 11 feet wide. The upstream slope is 4.0H:1V and the downstream slope is 3.0H:1V. The dam is subject to sudden drawdown because the approximate reservoir drawdown rate of 18 feet per day exceeds the critical rate of 0.5 feet per day for earth dams. The existing pool is 0.1 feet above normal. The dam has experienced overtopping with only minor erosion on the downstream face.

According to the guidelines presented in Design of Small Dams, U.S. Department of the Interior, Bureau of Reclamation for small homogenous dams, with a stable foundation, subject to a sudden drawdown and composed of silty sands (SM), the recommended slopes are 3.5H:1V upstream and 2.5H:1V downstream. The recommended width is 14 feet. Based on these guidelines, the dam has adequate slopes and an inadequate width.

6.2.3 Seismic Stability: The dam is located in Seismic Zone 2. Therefore, according to the Recommended Guidelines for Safety Inspection of Dams, the dam is considered to have no hazard from earthquakes provided static stability conditions are satisfactory and conventional safety margins exist.

6.2.4 Evaluation: There is insufficient information to adequately evaluate the stability of the dam. However, the visual inspection revealed no apparent instability. Based on the visual inspection, the foundation is considered sound. Based on the Bureau of Reclamation guidelines, the slopes are more than adequate, but the width is inadequate. Overtopping is not a problem because flows are shallow, last 4 hours, and the velocity is less than 6 fps, the effective eroding velocity for a vegetated earth embankment. Although the width is inadequate a stability analysis is not required because of the more than adequate slopes and that the visual inspection revealed no apparent problems.

SECTION 7

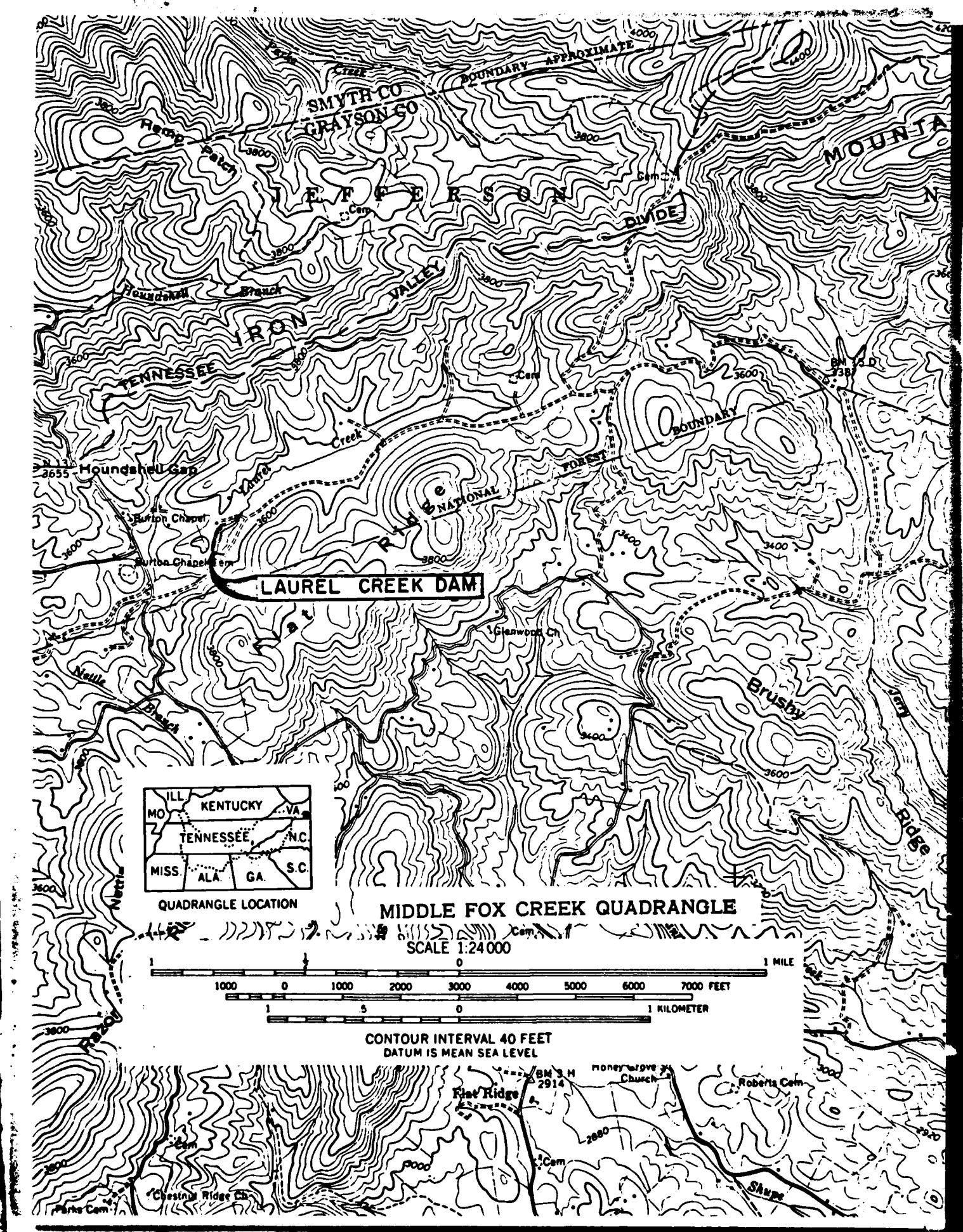
ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment: The available engineering data is insufficient to evaluate the embankment stability. However, the visual inspection revealed no findings to prove the dam unsound. Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) is the 100 year flood. The spillways will pass 9 percent PMF or 19 percent of the SDF without overtopping the crest of the dam. Flows overtopping the crest of the dam during the SDF are not considered detrimental to the dam. The spillways are considered inadequate, but not seriously inadequate. Overall the dam is in good condition and there is no immediate need for remedial measures. A stability check of the dam is not required.

7.2 Recommended Remedial Measures: It is recommended that the regular maintenance operation program be instituted and documented for future reference. A formal emergency procedure should be prepared, and furnished to all operating personnel. This should include how to operate the dam during an emergency, and who to notify, including public officials, in case evacuation from the downstream area is necessary. Also, the inspection revealed the following maintenance items that should be scheduled by the owner during a regular maintenance period within the next 12 months:

- a. The eroded gullies on the downstream face should be filled with compacted material, graded to conform with the existing slope, and reseeded.
- b. The seep and the wet area should be monitored for any increase in flow or turbidity during periodic inspections. If any increase in flow or turbidity is noted without an explanation the services of a geotechnical engineer should be obtained to investigate the causes of the increases.
- c. The shrubs and saplings on the downstream face should be cut off at their roots.
- d. A wire screen trash rack should be added to the intake structure to prevent debris from washing into the principal spillway.
- e. A staffgage should be installed in the reservoir to extend above the crest of the dam.

APPENDIX I
MAPS AND DRAWINGS



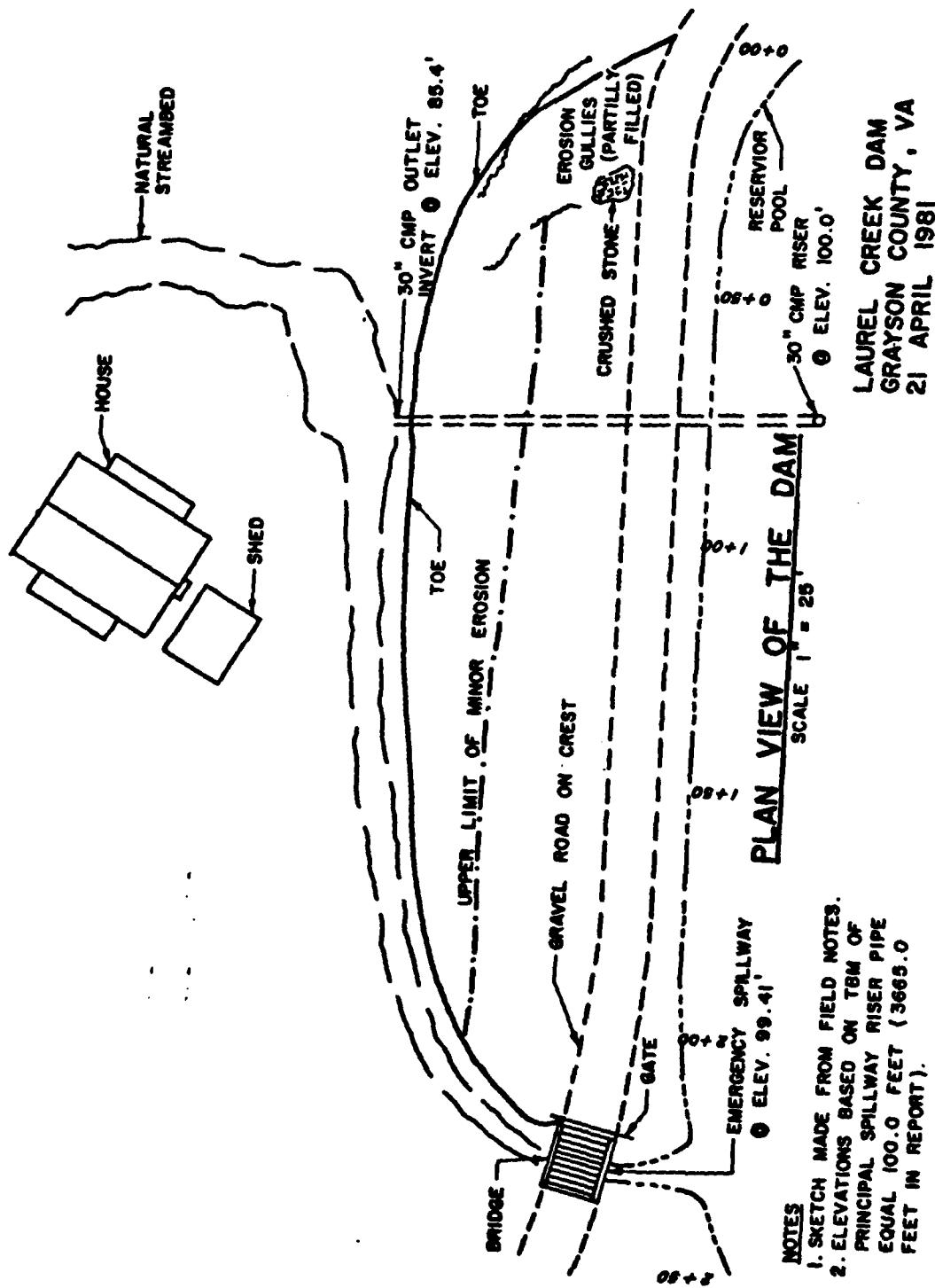
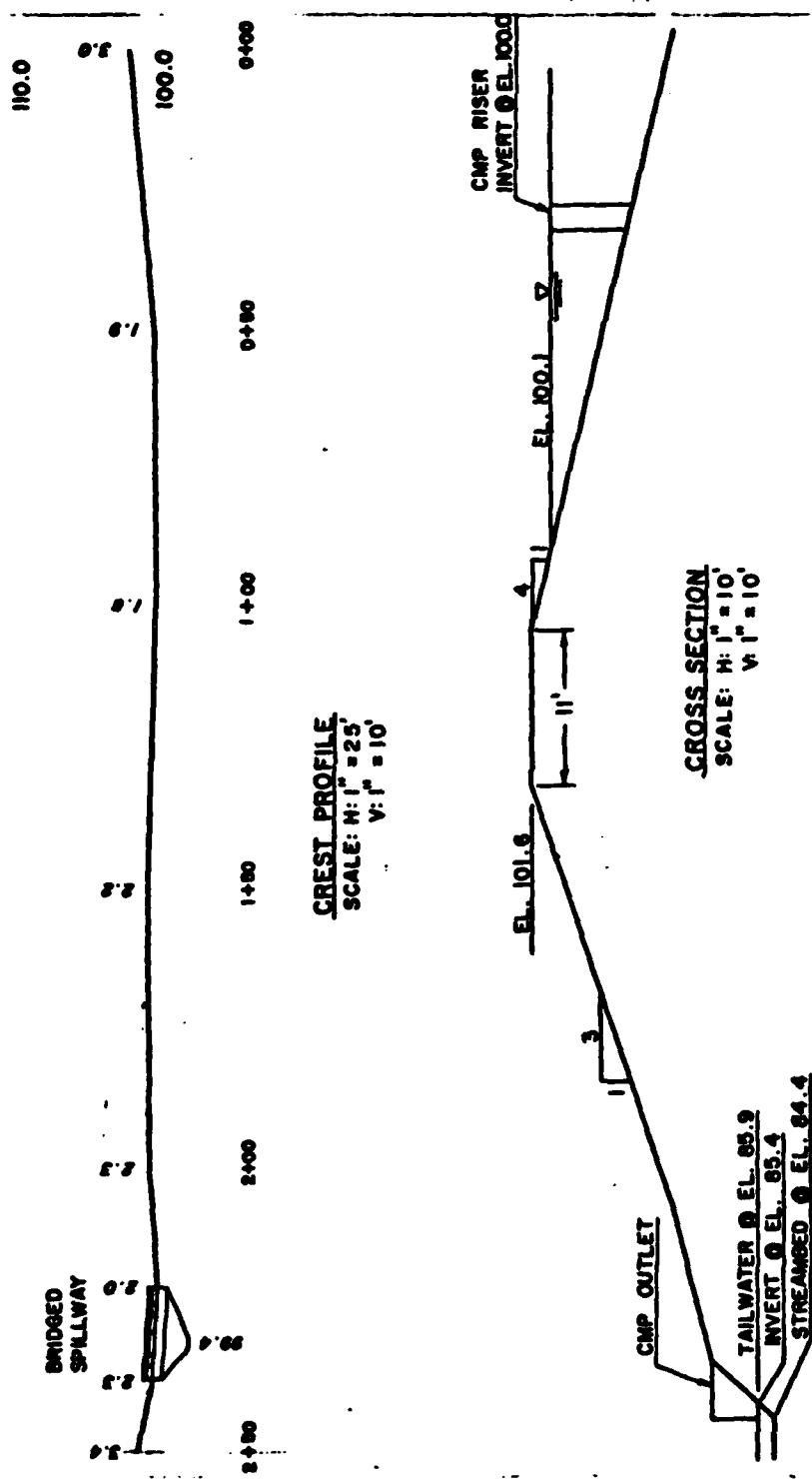


PLATE II

NOTES

1. SKETCH MADE FROM FIELD NOTES.
2. ELEVATIONS BASED ON TBM OF PRINCIPAL SPILLWAY RISER PIPE EQUAL 100.0 FEET (3665.0 FEET IN REPORT).



LAUREL CREEK DAM
GRAYSON COUNTY, VA
21 APRIL 1981

PLATE III

APPENDIX II
PHOTOGRAPHS



PHOTO #1 CREST OF DAM



PHOTO #2 UPSTREAM FACE OF DAM



PHOTO #3 DOWNSTREAM FACE OF DAM

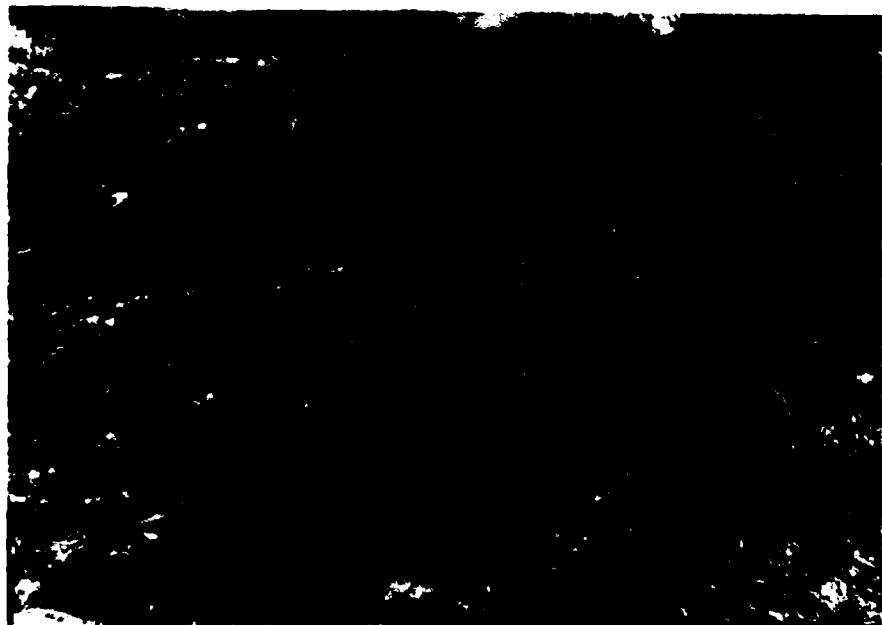


PHOTO #4 DOWNSTREAM FACE OF DAM

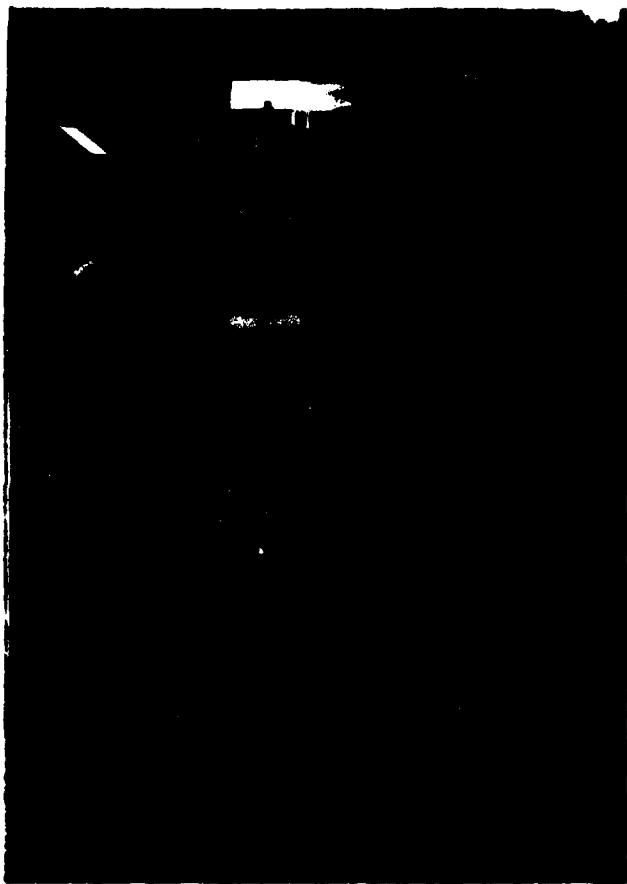
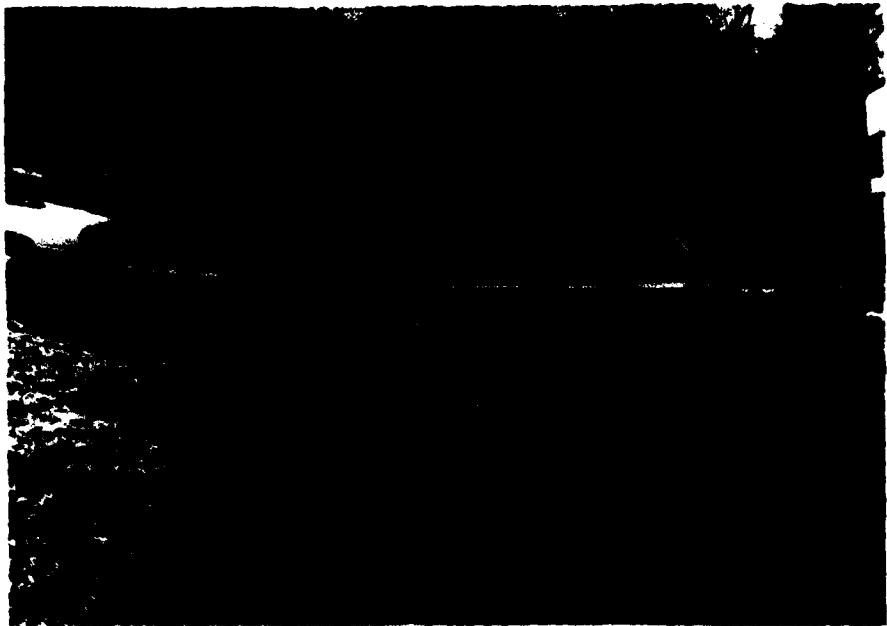


PHOTO #5
PRINCIPAL
SPILLWAY
INTAKE



PHOTO #6 PRINCIPAL SPILLWAY OUTLET



**PHOTO #7 EMERGENCY SPILLWAY (EMS)
APPROACH CHANNEL**



**PHOTO #8 EMERGENCY SPILLWAY
DISCHARGE CHANNEL**



**PHOTO #9 RUST COLORED SEDIMENT IN
EMS DISCHARGE CHANNEL**



**PHOTO #10 DOWNSTREAM AREA AND DISCHARGE
CHANNEL**

APPENDIX III
FIELD OBSERVATIONS

Check List
Visual Inspection
Phase I

Name Dam: Laurel Creek County: Grayson State: Virginia Coordinates: Lat 36° 43.7'N
Long 81° 22.6'W

Date of Inspection: 22 April 1981

Weather: Clear & Warm Temperature: 60° - 70° F.

Pool Elevation at Time of Inspection: 3565.6 ft nsf Tailwater at Time of Inspection: 3551.4 ft nsf

Inspection Personnel:

B. O. Taran, Corps of Engineers
Leonard Jones, Corps of Engineers
James Robinson, Corps of Engineers

Daniel Davis, Corps of Engineers
H. Gildes, State Water Control Board
Mr. Harvey Phipps Neighbor
Mr. Richardson, Owner

Davis and Robinson Recorders

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	There are no surface cracks. Ground conditions are moist due to recent rainfall.	None.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	There are no creep, slough, or bearing capacity problems.	None.
SLoughing OR Erosion OF EMBANKMENT AND ABUTMENT SLOPES	The dam has previously experienced overtopping and the lower third of the downstream face has scattered small eroded gullies. Near the right abutment this area extends approximately two thirds of the way up the downstream face. There is also an eroded ditch running down the downstream right abutment.	The eroded areas should be stripped of all vegetation, filled with compacted material, graded to conform with the existing slope, and reseeded.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	The crest serves as a gravel roadway and its alignment is straight. There is no noticeable settlement	None.
KIRPAP	There is no riprap on the embankment.	None.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
FOUNDATION	The owner and a local resident state that the dam is keyed into the foundation with a core trench. The foundation appears stable. There is no noticeable sliding or settlement. There are no known foundation drains. There are no rock outcrops in the area, however, sandstone boulders are prevalent on the right abutment and conglomerate boulders are on the left abutment.	None.
ANY NOTICEABLE SEEPAGE	A seep is located on the downstream toe approximately 30 feet left of the principal spillway outlet pipe. Very slight flow. Water is discolored with iron bacteria. A wet area extends from the seep to the outlet pipe along the toe.	The seep and wet area should be monitored for any increase in flow or turbidity during periodic inspection. If any increase in flow or turbidity is noted without an explanation the services of a geotechnical engineer should be obtained to investigate the causes of the increases.
DRAINS	There are no known embankment drains.	None.
MATERIALS	Materials for the embankment were taken from the upstream right abutment hillside. This material is a fine to medium sand (SM) with some (20%-30%) silt.	

VISUAL EXAMINATION OF EMBANKMENT		
	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VEGETATION	The embankment is well vegetated with grass except in the eroded areas on the downstream face. Several small shrubs and saplings are scattered on the downstream face.	The shrubs and saplings should be cut off at the ground surface.
OTHER	The road on the crest has been graded and the excess graded material was laid on the upstream face just below the crest.	None.

PRINCIPAL SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
CONTROL SECTIONS	The control section is a 30-inch CMP acting as a drop inlet. A 36-inch CMP extends above normal pool preventing trash from washing into the principal spillway.	A wire screen placed over the 36-inch CMP would prevent debris from washing into the spillway.
APPROACH CHANNEL	The approach channel is the reservoir.	None.
DISCHARGE CHANNEL	The 30-inch CMP outlets into a small rock lined stilling basin. The pipe is partially submerged at time of inspection.	None.
EMERGENCY GATE	A wire cable attached to a drawdown gate at the bottom of the reservoir is tied to the drop inlet. Lifting the cable will activate the gate.	None.

EMERGENCY SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
CONTROL SECTIONS	The control section is the area between the bridge opening and the reservoir. The bridge restricts flows by reducing the opening of the channel.	None.
APPROACH CHANNEL	The approach channel is the reservoir border that leads to the spillway channel. A small eroded path has been washed from the normal channel. The approach channel is well vegetated.	None.
DISCHARGE CHANNEL	The discharge channel is a slightly eroded channel that directs flows into the downstream channel at the stilling basin.	None.
BRIDGE AND PINS	A wooden bridge passes over the control section of the emergency spillway. The bridge obstructs flows through the spillway at high pool elevations.	None.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
MONUMENTATION/SURVEYS	There are no known monuments in the immediate area.	None.
OBSERVATION WELLS	There are no observation wells.	None.
WEIRS	There are no weirs.	None.
PIEZOMETERS	There are no piezometers.	None.
STAFFAGES	There are no staffages.	A staffage should be installed in the reservoir to extend above the crest of the dam .

RESERVOIR

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	The reservoir slopes are gently to moderately steep throughout the watershed. Much of the land is pasture land while the outer perimeter is heavily wooded. The reservoir slopes have very mild erosion due to wave action in the reservoir.	None.
SEDIMENTATION	The inspection team was unable to evaluate sedimentation in the reservoir.	None.

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	A cabin is located immediately below the outlet adjacent to the downstream channel. Rocks and trees line the channel as it passes by another cabin about 1000 feet downstream.	None.
SLOPES	The slopes are moderately steep to steep with many trees. Rock outcrops are numerous in the area.	None.
APPROXIMATE NO. OF HOMES AND POPULATION	Two cabins are located below the dam. These cabins are inhabited only part of time by hunters.	None.

APPENDIX IV

REFERENCE

REFERENCES

1. Recommended Guidelines for Safety Inspection of Dams, Office of the Chief of Engineers, Department of the Army, Washington, D. C.
2. HEC-1DB Flood Hydrograph Package, (Hydrologic Engineering Center, U. S. Army Corps of Engineers, September 1978.)
3. "Probable Maximum Precipitation Estimates, United States East of the 105th Meridian," Hydrometeorological Report No. 51, (U. S. Weather Bureau, June 1978).
4. "Rainfall Frequency Atlas of the United States", Technical Paper No. 40, (U.S. Weather Bureau, May 1961).
5. "Design of Small Dams", Technical Publication of United States Department of the Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1977.
6. Geology of the Appalachian Valley in Virginia. Charles Butts, VGS Bul 52 1940.
7. Geology of the Appalachian Valley in Virginia. Charles Butts, VGS Bul 42 Vol. I.
8. Geology Map of Virginia. James L. Carver. VDMR 1963